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ABSTRACT

A checklist of criteria for evaluating textbooks in occupational education is presented, providing a rapid and effective way for instructors to assess occupational textbooks. The checklist encourages occupational education instructors and administrators to look at the qualities of textbooks that go beyond the subject content and readability levels of a textbook. The checklist suggests criteria that are needed for student comprehension of any text regardless of the occupation being taught. The appendices offer ways to determine what textbooks are available for use in occupational education content area courses and sample checklists and responses. (PN)

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Criteria for Evaluating Instructional Textbooks in Occupational Education

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CRITERIA FOR EVALUATING INSTRUCTIONAL TEXTBOOKS IN OCCUPATIONAL EDUCATION

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FOREWORD

Students need to be able to read and comprehend occupational education textbooks. Through this publication, the New York State Office of Occupational and Continuing Education (OOCE) presents criteria to help educators select textbooks appropriate for their classroom use.

This publication provides a resource for individuals to use in evaluating occupational education textbooks from a total reading perspective. It should be useful to instructors, administrators, librarians, and others who must select reading materials for occupational education students.

This publication has been reviewed by a number of persons working in the fields of occupational education and reading. Staff and administrators from the Oswego County Board of Cooperative Education Services (BOCES) provided technical assistance and reviewed this publication during its many draft stages. Staff from selected occupational education content Bureaus within OOCE assisted in the development of the checklist that provides the basis for the review of textbooks presented here.

This publication was developed under provisions of the Vocational Education Act of 1963 (P.L. 94-482) and 1976 Amendments (P.L. 88-210).

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INTRODUCTION

This publication briefly describes criteria for evaluating textbooks in occupational education. Its purpose is to assist occupational educators in selecting textbooks that are appropriate for their classes.

The checklist approach used in this publication provides a rapid and effective way for instructors to assess occupational textbooks. It allows an instructor to examine printed material currently being used or to select new material on the basis of qualities that make textbooks readable and appropriate for secondary occupational education students.

As you evaluate instructional materials for your occupational education students, answer the questions on the checklist. Your judgments concerning each item on the checklist are important. You are the best person to judge the effectiveness of textbooks for your class. You know the content, the students, and the curriculum. You also know the wide range of reading abilities represented within each class.

Frequently, printed materials are assessed by means of a readability formula. Before using the checklist, it is important to understand the basis of readability. The following questions and responses will help you gain an understanding of the purposes and limitations of readability formulas.

What is readability?

For the purpose of this publication, readability is defined as "the ease of understanding or comprehension due to style of writing" (Hill, 1979, p. 190). Certain qualities of printed material, such as the length of sentences, make it easy or difficult for the reader to comprehend the information.

How can readability be measured?

The appropriate matching of reader and printed materials is the principle underlying readability analysis. The most widely used method of assessing the ease of understanding printed material (readability) is by means of a readability formula. A readability formula is a predictive device that yields an estimate in grade-level scores or in numbered units. The set of components which are used differ from formula to formula. Word length (number of syllables), sentence length, number of easy and/or difficult words as determined by a word list, and number of words in a 100-word passage, are examples of the possible components of a readability formula.

What are the limitations of readability formulas?

Readability formulas differ in the components used. Consequently, the same text can yield different readability levels depending on which formula is chosen. There are nearly fifty formulas available for possible use by teachers, although few have been designed specifically for use with technical material. It is important to keep in mind that readability formulas only estimate a possible reading grade level. They are not exact, and therefore should not be used as the sole predictor of the level of textbook difficulty. Caution should be used when choosing a textbook on the basis of a formula alone.

Since the occupational education instructor does not always have access to records that supply a student's grade level or unit scores in reading, it may be difficult to match a student's reading level with a textbook that has a known readability level. Even if this matching were possible, it has been found that a specific grade level score on a reading test does not always correspond with the same readability score for a given textbook.

Many factors other than those used to obtain a readability score influence how easily a book is understood. A readability score is designed only to give an approximate grade-level for a textbook. It does not examine the content of the book, the technical vocabulary, nor how charts, graphs, or tables contribute to the understanding of the technical material. It does not indicate what teaching aids are available nor does it help evaluate how clearly ideas are explained in a textbook.

How should the checklist be used?

The purpose of the checklist is to encourage occupational education instructors and administrators to look at the qualities of textbooks that go beyond the subject content and readability level of a textbook. The checklist suggests criteria that are needed for student comprehension of any text regardless of the occupation being taught.

Read each question on the checklist and make a judgment regarding a textbook being examined. Check yes or no for each item on the checklist. Check the NA column for items that are not suitable for your content area. The checklist does not recommend a number of yes answers to make a textbook "acceptable" for classroom use. There are no standards or cut-off points that apply to the checklist. You may make a decision regarding how important each item is for your own instructional needs. Your judgment concerning which items are most important for your own students will help determine the selection of an appropriate textbook.

A last word

Appendix A offers some suggestions for ways to determine what textbooks are available for use in occupational education content area courses. Sample checklists and responses are provided for your reference in Appendices B and C. The section entitled "Comments" on the sample responses may clarify any questions you may have concerning how you should rate an occupational education textbook. The textbooks chosen as models were selected on the basis of their availability. Their selection for use in this publication should not be considered as an endorsement.

A Checklist for Evaluating Instructional Textbooks in Occupational Education

		Yes	No	NA
Author				
1.	Do the author's credentials seem to qualify him/her as an expert in the field?	___	___	___
2.	Do the authors and/or consultants have experience in the subject area?	___	___	___
Content				
3.	Does this book match the instructional content for the course curriculum?	___	___	___
4.	Is the content timely and up to date?	___	___	___
5.	Are the chapters and/or size of the reading units short enough to hold the reader's interest?	___	___	___
6.	Has the author presented the occupational content toward the appropriate student level? (i.e., secondary vs. postsecondary)	___	___	___
7.	Is information presented in a logical order by chapter or within chapters?	___	___	___
8.	Are the technical terms defined in the textbooks?	___	___	___
9.	Are clues to the meaning of technical terms provided?	___	___	___
10.	Are abbreviations, symbols, and/or formulas clarified?	___	___	___
11.	Does the book introduce new concepts at an appropriate pace?	___	___	___
12.	Does the book incorporate important safety rules? (i.e., information on OSHA, NOSHA)	___	___	___

NA = not appropriate to the occupational area

		Yes	No	NA
13.	Are males/females pictured in non-traditional as well as traditional roles?	___	___	___
14.	Does the textbook provide a clear explanation when introducing new concepts?	___	___	___
15.	Does the textbook give concrete examples when introducing difficult ideas?	___	___	___
16.	Is the equipment presented with a sufficient degree of simplicity as needed for classroom instruction?	___	___	___
Illustrations				
17.	Does the book provide diagrams or illustrations needed for occupational understanding?	___	___	___
18.	Are the illustrations explained clearly and referenced to the narrative?	___	___	___
19.	Are the illustrations and diagrams clearly labeled?	___	___	___
20.	Can the reader easily match the illustrations to the printed material? (i.e., pictures can lose their value if they are located too far from the discussion to which they pertain)	___	___	___
21.	Are the illustrations provided in a sequential manner?	___	___	___
22.	Are simplified diagrams presented for the entry level student?	___	___	___
23.	Does the textbook provide enough illustrations and diagrams to capture the interest of a student?	___	___	___
24.	Are the tools and supplies illustrated in the textbook common for use in the occupations?	___	___	___
Organization				
25.	Is the print size appropriate to the material and the student?	___	___	___
26.	Is the print easy to read?	___	___	___

NA = Not appropriate to the occupational area

		Yes	No	NA
27	Are the tasks involved in a procedure presented in a logical order?	___	___	___
28.	Is the information arranged clearly, with appropriate subheadings?	___	___	___
29.	Is the format of the book appealing and attractive for its intended audience?	___	___	___
30.	Are student objectives listed at the beginning of each chapter?	___	___	___
31.	Is an introduction provided for each chapter?	___	___	___
32.	Does the book have reference aids that are clear and easy to use such as table of contents, index, bibliography, and appendices?	___	___	___
33.	Within the narrative is the reader directed to the appendices for further information?	___	___	___
34.	Are summaries provided at appropriate intervals in the text to reinforce learning?	___	___	___
35.	Does the book contain a glossary or list of definitions?	___	___	___
36.	Do glossaries give definitions that are easily understood?	___	___	___
37.	Are review questions provided at the end of each chapter and/or section?	___	___	___
	A. Are the directions easily understood?	___	___	___
	B. Are questions clearly stated?	___	___	___
	C. Are the questions designed to test the reader's understanding of textbook material?	___	___	___
	D. Are the questions pertinent to the basic principles of the occupation or task?	___	___	___
	E. Do the questions provide an opportunity for the student to draw conclusions based on facts presented in the chapter?	___	___	___
38.	Does the text provide suggested activities for students to expand their newly learned skills?	___	___	___

NA = Not appropriate to the occupational area

Teaching Aids	Yes	No	NA
39. Does the publisher provide:			
A. A teacher's manual?	___	___	___
A1. Does the teacher's manual assist the instructor in planning individual lessons?	___	___	___
A2. Are answers to chapter questions provided in the manual?	___	___	___
A3. Does the manual contain a reprint of pages from the student's text?	___	___	___
A4. Does the manual provide a bibliography?	___	___	___
A5. Does the manual include a list of films, tape recordings, etc. for teacher use?	___	___	___
A6. Does it provide a discussion question for the teacher, to stimulate a class to talk about the lesson?	___	___	___
A7. Are suggestions for student activities and projects provided for each chapter?	___	___	___
B. Workbooks?	___	___	___
B1. Are workbooks suitable for the student to work on an independent basis?	___	___	___
B2. Do the workbooks reinforce major ideas presented by the textbook?	___	___	___
C. Audiovisual aids? (i.e. filmstrips, movies, overhead transparencies)	___	___	___
D. Ditto masters?	___	___	___
D1. Does each textbook chapter have a corresponding review ditto?	___	___	___

		Yes	No	NA
E.	Tests?	___	___	___
E1.	Do the questions test major concepts needed for competency in the occupations?	___	___	___

Cost and Durability

40.	Is the cost of the textbook reasonable?	___	___	___
41.	Is the book durable enough to last three to five years under normal student use?	___	___	___

NA = Not appropriate to the occupational area

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APPENDIX A

If you are looking to adopt a new textbook, it would be advisable to:

- Check recent editions of the Journal of the American Vocational Association (Voc Ed) for advertisements of occupational education textbooks.
- Write to textbook publishing companies which specialize in occupational education textbooks. Request sample or complimentary copies for you to review.
- Contact instructors teaching in your occupational area to ask their opinions about textbooks they are currently using or have used in the past.
- Ask your principal to arrange an in-service meeting which focuses on textbook identification. This can be achieved by inviting textbook representatives to display their current offerings at an in-service meeting.
- Establish a committee consisting of 3-5 students per occupational area to preview potential textbooks.

Textbook: Fundamentals of Machine Operation - Preventive Maintenance
Author: Louis Hathaway
Publisher: Deere & Company. Moline, Ilnois
Copyright: 1973

Model Checklist #1
A Checklist for Evaluating Instructional Textbooks in Occupational Education

		Yes	No	NA	Comments
Author					
1.	Do the author's credentials seem to qualify him/her as an expert in the field?	X			The author has experience in teaching on both high school and college levels and has written other textbooks on the same subject. (p. ii)*
2.	Do the authors and/or consultants have experience in the subject area?	X			The consulting editors and publishers are well qualified and experienced in the preparation of instructional materials.
Content					
3.	Does this book match the instructional content for the course curriculum?	X			
4.	Is the content timely and up to date?	X			There is a newer edition available of this textbook, however.
5.	Are the chapters and/or size of the reading units short enough to hold the reader's interest?	X			There is an average of 16 pages per chapter and six subdivisions per chapter. These subdivisions denote theme changes.
6.	Has the author presented the occupational content toward the appropriate student level? (i.e., secondary vs. postsecondary)	X			The content is appropriate for either level.
7.	Is information presented in a logical order by chapter or within chapters?	X			The information is arranged around machinery systems - see table of contents for order presentation. (p. iii - v, p. 8)*
8.	Are the technical terms defined in the textbook?	X			Vocabulary is highlighted within each chapter using bold face type or italics to emphasize new words. Parentheses are placed around technical terms. There is no pronunciation key. (p.8)*
9.	Are clues to the meaning of technical terms provided?	X			

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comments
10.	Are abbreviations, symbols, and/or formulas clarified?	X			A special page of abbreviations is provided for student use at end of the book, and in the narrative, to reinforce use of special abbreviations. (p. 233)*
11.	Does the book introduce new concepts at an appropriate pace?	X			The concepts are introduced system by system.
12.	Does the book incorporate important safety rules? (i.e., information on OSHA, NOSHA)	X			Rules are stated in logical sequence. (p. 161)*
13.	Are males/females pictured in non-traditional as well as traditional roles?		X		
14.	Does the textbook provide a clear explanation when introducing new concepts?	X			Pictures and diagrams of actual engine parts are included with a written description to introduce new concepts and difficult ideas. (p. 10, 11)*
15.	Does the textbook give concrete examples when introducing difficult ideas?	X			
16.	Is the equipment described with a sufficient degree of simplicity as needed for classroom instruction?	X			
Illustrations					
17.	Does the book provide adequate diagrams or illustrations needed for occupational understanding?	X			Illustrations and diagrams can be easily read and the relationships identified within the narrative. Illustrations and narrative are near each other. (p. 10, 11)*
18.	Are the illustrations explained clearly and referenced to the narrative?	X			

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comments
19.	Are the illustrations and diagrams clearly labeled?	X			
20.	Can the reader easily match the illustrations to the printed material? (i.e., pictures can lose their value if they are located too far from the discussion to which they pertain)	X			
21.	Are the illustrations provided in a sequential manner?	X			
22.	Are simplified diagrams presented for the entry level student?	X			
23.	Does the textbook provide enough illustrations and diagrams to capture the interest of a student?	X			The diagrams are provided with color-coded arrows to clarify flow patterns.
24.	Are the tools and supplies illustrated in the textbook common for use in the occupations?	X			Specific tools are illustrated. (p. 27)*
Organization					
25.	Is the print size appropriate to the material and the student?	X			The text uses a variety of print sizes to emphasize, illustrate and/or get the subject matter across to the student.
26.	Is the print easy to read?	X			
27.	Are the tasks involved in a procedure presented in a logical order?	X			The material is presented from a simple to a complex order.

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comments
28.	Is the information arranged clearly, with appropriate subheadings?	X			The subheadings make it easy to locate specific information.
29.	Is the format of the book appealing and attractive for its intended audience?	X			The book has a wide range of illustrations, diagrams, and photos incorporated in the narrative.
30.	Are student objectives listed at the beginning of each chapter?		X		
31.	Is an introduction provided for each chapter?	X			An introduction is provided at the beginning of each chapter and throughout chapters whenever new concepts are introduced. (p. 8,9)*
32.	Does the book have reference aids that are clear and easy to use, such as table of contents, index, bibliography and appendices?	X			There is a table of contents and index. No bibliography or appendix is provided within the student text. (p. III - V, p. 235-238)*
33.	Within the narrative is the reader directed to the appendices for further information?			X	Appendices are not included in this text.
34.	Are summaries provided at appropriate intervals in the text to reinforce important learning?	X			Summaries are logically placed to recap important information at the end of each chapter.
35.	Does the book contain a glossary or list of definitions?	X			
36.	Do glossaries give definitions that are easily understood?		X		The glossary terms may be difficult for beginning students to understand. Not all vocabulary terms can be found in the glossary. The definitions are more technical in the glossary than in the narrative. (p. 228-233)*

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comments
37.	Are review questions provided at the end of each chapter and/ or section?	X			Questions are available for use as a chapter quiz, but directions were found to be quite complicated and poorly explained. Questions were well chosen for content. (p. 27)*
	A. Are the directions easily understood?		X		
	B. Are questions clearly stated?		X		
	C. Are the questions designed to test the reader's understanding of textbook material?	X			Various question formats are used to test the student's understanding of the material.
	D. Are the questions pertinent to the basic principles of the occupation or task?	X			
	E. Do the questions provide an opportunity for the student to draw conclusions based on facts presented in the chapter?	X			
38.	Does the text provide suggested activities for students to expand their newly learned skills?	X			The book provides instructions on ways to perform a skill and also provides evaluation of each newly learned skill. (p. 26)*
Teaching Aids					
39.	Does the publisher provide:				
	A. A teacher's manual?	X			
	A1. Does the teacher's manual assist the instructor in planning individual lessons?	X			

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comments
A2.	Are answers to chapter questions provided in the manual?	X			
A3.	Does the manual contain a reprint of pages from the student's text?		X		The instructor is referred to pages in the corresponding student text.
A4.	Does the manual provide a bibliography?	X			An extensive bibliography is provided for teacher use.
A5.	Does the manual include a list of films, tape recordings, etc. for teacher use?	X			
A6.	Does the manual provide discussion questions for the teacher to stimulate a class to talk about the lesson?	X			The manual contains various levels of "trouble shooting" questions to test students' understanding of practical engine operations.
A7.	Are suggestions for student activities and projects provided for each chapter?	X			
B.	Work books?	X			
B1.	Are workbooks suitable for the student to work on an independent basis?	X			
B2.	Do the workbooks reinforce major ideas presented by the textbook?	X			

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comments
C.	Audiovisual aids? (i.e., filmstrips, movies, overhead transparencies)	X	___	___	Overhead transparencies, slide sets, and audio cassettes are available.
D.	Ditto masters?	X	___	___	Instructor's kits are available which contain dittos and possible test items.
D1.	Does each textbook chapter have a corresponding review ditto?	X	___	___	
E.	Tests?	X	___	___	
E1.	Do the questions test major concepts needed for competency in the occupation?	X	___	___	

Cost and Durability

40.	Is the cost of the textbook reasonable?	X	___	___	Cost range is $7-$10.
41.	Is the book durable enough to last three to five years under normal student use?	X	___	___	The quality of the paper is excellent.

*The numbers in parenthesis refer to the sample pages from the textbook.

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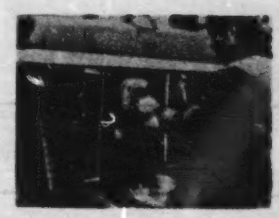

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INTRODUCTION

An engine must "breathe" to create energy just as you do (Fig. 1). The intake and exhaust systems are the breathing apparatus of an engine. They carry the fuel-air mixture into the engine and remove the exhaust gases after combustion (Fig. 2).

INTAKE SYSTEM

The intake system supplies the engine with clean air of the proper quantity and temperature for good combustion.

The intake system has five basic parts:

- **Air cleaners**
- **Turbocharger (optional)**
- **Air inlet**
- **Intake manifold**
- **Intake valves**

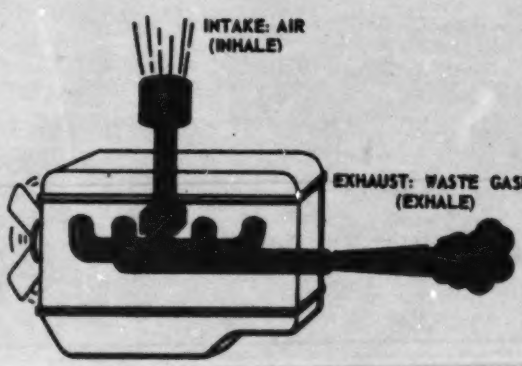
AIR CLEANERS filter dust and dirt from the air passing through them enroute to the carburetor (Fig. 3). Pre-cleaners prevent larger particles from reaching the air cleaner and plugging it.

TURBOCHARGERS (or Superchargers) increase horsepower by packing more air or fuel-air mixture into the engine cylinders than the engine could draw in by itself.

AIR INLET supplies fuel mixed with incoming air in the proper ratio for combustion, and also controls engine speed. (On spark-ignition engines, this mixture comes from the carburetor. On diesel engines, air only is provided, with fuel injected later at the engine cylinders.)

INTAKE MANIFOLDS transport the fuel-air mixture (pure air in diesel engines) to the engine cylinders.

Fig. 1—An Engine Must "Breathe"



INTAKE VALVES admit the air or fuel-air mixture to the engine cylinders for burning. They are normally opened and closed by linkage from the engine camshaft.

EXHAUST SYSTEM

The exhaust system collects the exhaust gases after combustion and carries them away. This is really three jobs: (1) Removing heat; (2) Muffling engine sounds; (3) Carrying away burned and unburned gases.

The exhaust system has three basic parts:

- **Exhaust valves**
- **Exhaust manifold**
- **Muffler**

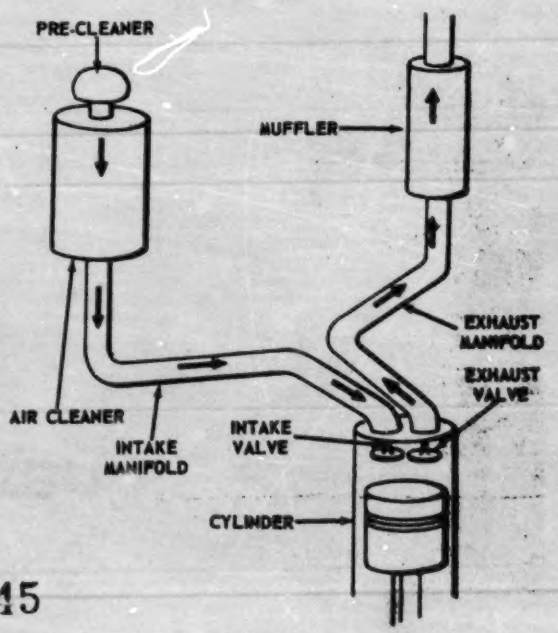
EXHAUST VALVES open to release the burnt gases from the cylinder after combustion. The valves are normally opened and closed by the camshaft.

The EXHAUST MANIFOLD collects the exhaust gases and conducts them away from the cylinders.

The MUFFLER reduces the sounds of the engine during the exhaust period.

Now we will study the intake and exhaust systems in more detail.

Fig. 2—Intake And Exhaust Systems



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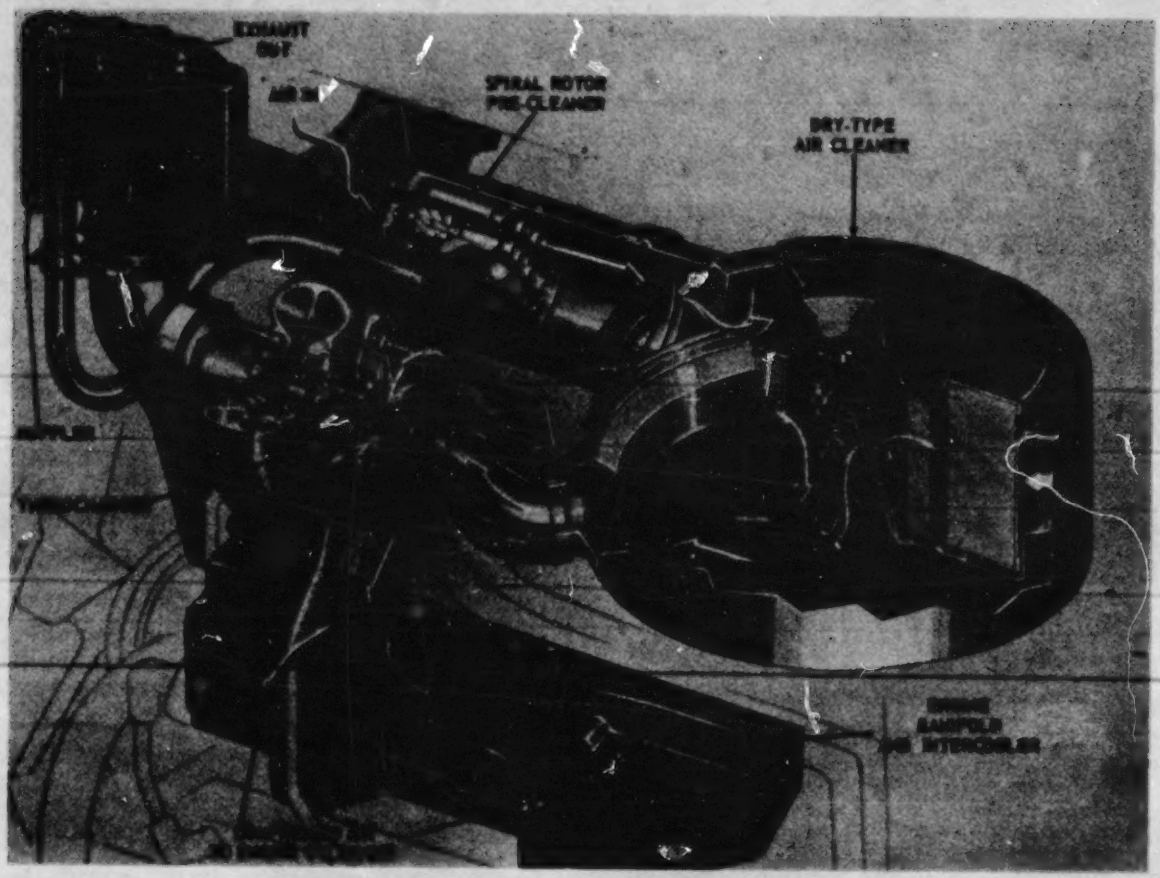

Fig. 3—Intake And Exhaust System Of A Typical Modern Engine

Fig. 4—Good Air Cleaner Maintenance Keeps Engines Going When Conditions Are Toughest

AIR CLEANERS AND AIR DUCTS

INTRODUCTION

The average gasoline engine mixes 9,000 gallons of air (by volume) with every gallon of gasoline it consumes. This amount of air can contain enough dirt to wear the engine prematurely if unfiltered.

An air cleaner must have the capacity to hold material taken out of the air so that the engine can operate for a reasonable period before cleaning and servicing are necessary.

Multiple air cleaner installations are sometimes used where engines are operated under extremely dusty conditions or where two small air cleaners must be used in place of a single large cleaner.

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HOW DIRTY AIR CAN DAMAGE ENGINES

Consider these facts:

In some dusty environments, an engine can be ruined:

1. If an air hose comes off for only a few hours.

2. If a mere pinhole leak in a hose is left for a full season.

Keep this in mind when you think of air cleaning systems.

Agricultural engines operate in some very tough conditions (Fig. 4) and this makes air cleaner service doubly important.

TYPES OF AIR CLEANERS

The major types of air cleaners are:

- **Pre-cleaners**
- **Dry element air cleaners**
- **Oil bath air cleaners**

Let's examine these more closely.

Pre-Cleaners

Pre-cleaners (Fig. 5) are usually installed at the end of a pipe extended upward into the air from the air cleaner inlet. This places them in an area relatively free of dust.

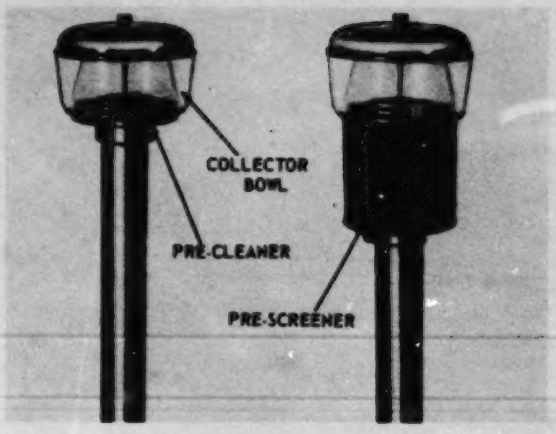
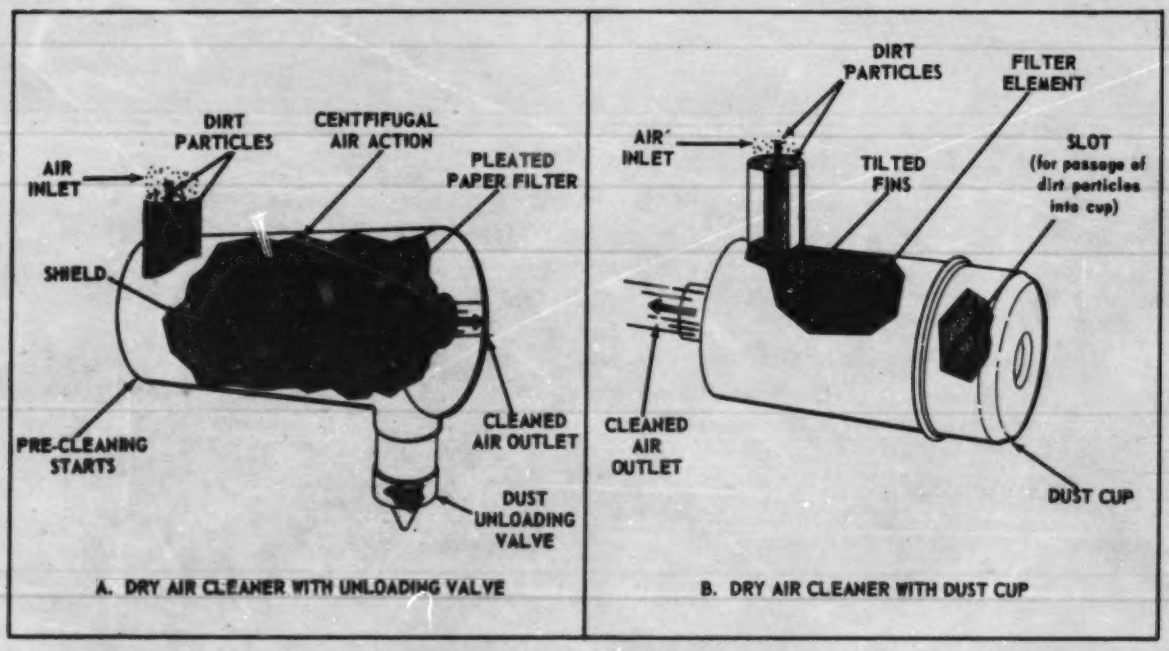


Fig. 5—Pre-Cleaner and Pre-Screener

Pre-cleaners remove larger particles of dirt or other foreign matter from the air before it enters the main air cleaner. This relieves much of the load on the air cleaner and allows longer intervals between servicing.

Most pre-cleaners have a *pre-screener* (Fig. 5) which prevents lint, chaff, and leaves from entering the air intake. However, the pre-screener can become plugged quickly under some conditions, thus preventing air from entering the air cleaner.

Fig. 6—Dry Element Air Cleaners—Two Types



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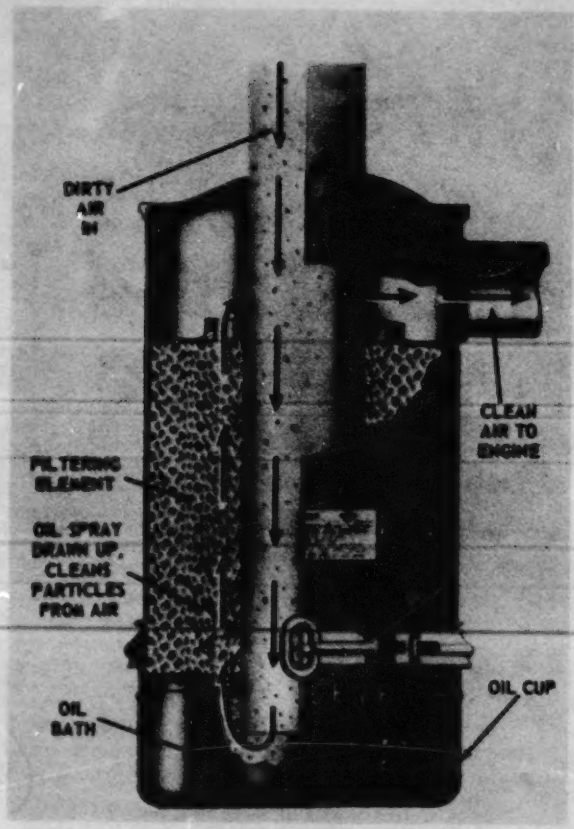

Fig. 7—Medium-Duty Oil Bath Air Cleaner

Dry Element Air Cleaners

Two major types of dry-type cleaners are used at the present time (Fig. 6).

Dry air cleaners are built for two-stage cleaning:

1) Precleaning

2) Filtering

The first stage (precleaning) directs the air into the cleaner at high speed so that it sets up centrifugal rotation (cyclone action) around the filter element.

The cleaner shown in Fig. 6A directs the air into the *pre-cleaner* so it strikes one side of the metal shield. This starts the centrifugal action which continues until it reaches the far end of the cleaner housing. At this point, the dirt is collected into a dust cap, or dust unloader, at the bottom of the housing.

The cleaner shown in Fig. 6B conducts the air past *tilted fins* which start the centrifugal (cyclone) action. When the air reaches the end of the cleaner housing, the dirt passes through a slot in the top of the cleaner and enters the dust cup.

In both types, *this precleaning action removes from 80 to 90 percent of the dirt particles* and greatly reduces the load on the filter.

The partially cleaned air then passes through the holes in the metal jacket surrounding the pleated-paper filter. *Filtering* is done as the air passes through the paper filter. It filters out almost all of the remaining small particles. This is the second stage of cleaning.

Some heavy-duty cleaners use a spiral rotor device for precleaning the air as shown in Fig. 3. Others have a small safety element built into the unit in case the main element fouls.

If the air cleaner has a *dust cup* (Fig. 6B) it should be emptied daily. If an *automatic dust unloader* is used in place of a cup (Fig. 6A), it is usually recommended that it be checked at least once daily to make certain it doesn't become clogged. The dust unloader is a rubber duck-bill device that is held closed by engine suction while the engine is running. When it stops, the weight of the accumulated dirt helps open the flaps so the dirt can drop out.

Some dry-type cleaners are equipped with a *vacuum gauge or restriction indicator* to show when the filter needs cleaning (see inset, Fig. 13). The indicator is attached to the intake manifold of the tractor. *As the dirt accumulation builds up on the filter, air flow is restricted.* This increases the suction in the intake manifold and causes the indicator to show red. To maintain engine operating efficiency, it is important that the filter be serviced at once.

Oil Bath Air Cleaners

Medium-duty oil bath air cleaners (Fig. 7) draw air down a center tube where it strikes the surface of oil in a partly filled cup. The impact causes a mixture of air and oil spray to be carried up into the element of baffles and wire mesh. The separating element breaks up the dust-laden air and fine dust particles are trapped by the oil film. The particles are then washed down as the oil later drains back into the cup. Clean air continues through the element and on to the engine.

The washing down of the oil keeps the filter element fairly clean.

The major services are (1) to keep the oil cup filled to the proper level with the correct weight of oil, and (2) to replace the oil when it gets dirty or thickens, reducing its ability to clean particles from the air.

However, at least once each year, the air cleaner should be disassembled and the filter element cleaned in solvent.

NOTE: Today's detergent oils may hold the dirt in suspension. For this reason the need for oil cup service cannot be determined by the layer of dirt which has settled into the bottom of the cup. Instead, see if the oil has thickened due to dirt.

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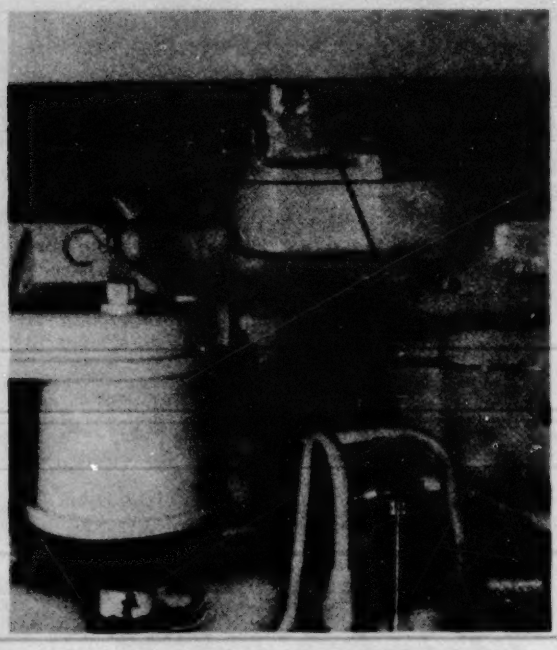


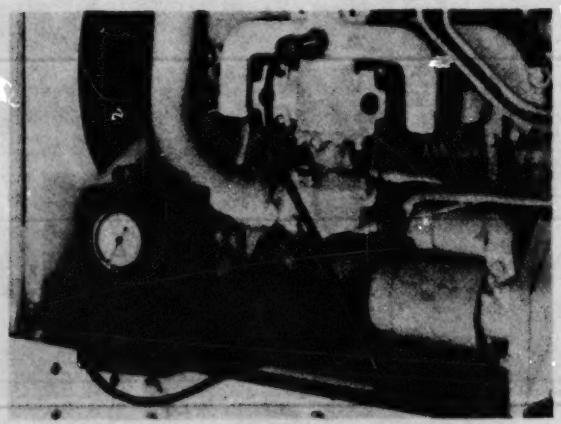
Fig. 37—Manometer or Gauge Connection Point (Diesel Engine)

the valve rather than cleaning it.

If a vent tube is used in the system (Fig. 36), periodically remove and clean it with a solvent. If a filter is used with the vent tube, be sure to clean it, too.

Keeping the engine clean and free of caked-on dirt and oil also helps in crankcase ventilation and general engine cooling.

Fig. 38—Testing Manifold Depression With a Vacuum Gauge (Spark-Ignition Engine)



TESTING AIR INTAKE SYSTEM

When the air flow into the engine is restricted, there is more vacuum or suction in the cylinders. This can cause oil to be drawn in around the valve stems and pistons and so increase oil consumption.

Complete air cleaner service will usually correct the air flow restriction to the engine. However, if a restriction is still suspected, use the tests which follow.

INTAKE VACUUM TEST (DIESEL ENGINES)

Test as follows:

1. Warm up the engine.
2. Connect the gauge to the intake manifold (Fig. 37).
3. Set engine speed at fast idle and note the reading on the gauge. *Too high a reading means that there is a restriction in the air intake system.* Check the engine technical manual for correct specifications.
4. If a restriction is shown by this test, have a serviceman inspect the engine.

MANIFOLD DEPRESSION TEST (SPARK-IGNITION ENGINES)

Use a vacuum gauge calibrated in inches of mercury to perform this test.

1. Connect the vacuum gauge to the intake manifold (Fig. 38).
2. Warm up the engine and operate it at idle speed.
3. Note the reading on the vacuum gauge. Check the engine technical manual for exact specifications.
4. Interpret the gauge reading as given below.

Judging Test Results

- *If the reading is steady and low,* loss of power in all cylinders is indicated. Possible causes are late ignition, bad valve timing or loss of compression at valves or piston rings. A leaky carburetor gasket will also cause a low reading.
- *If the needle fluctuates steadily,* a partial or complete loss of power in one or more cylinders is indicated. This can be due to an ignition defect, or loss of compression due to stuck piston rings or a leaky cylinder head gasket.
- *Intermittent needle fluctuation* indicates occasional loss of power due to an ignition defect or a sticking valve.
- *Slow needle fluctuation* is usually caused by improper carburetor idle mixture adjustment.
- *A gradual drop in the gauge reading* at idle engine speed indicates back pressure in the exhaust system due to a restriction.

Be very careful in analyzing abnormal readings since

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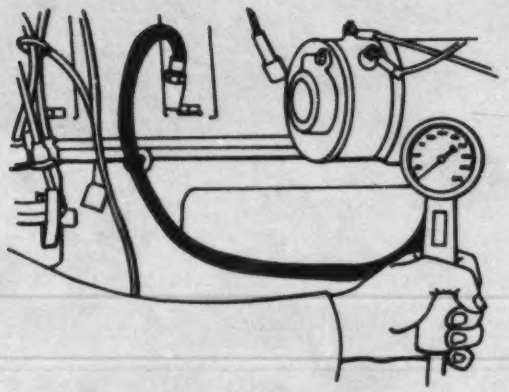

Fig. 39—Checking Engine Compression With A Pressure Gauge

the gauge readings can indicate more than one thing. An air cleaner restriction is the most common cause, but this should be corrected before making the above test. If a problem still exists, have a serviceman inspect the engine.

TESTING ENGINE COMPRESSION

Weak compression results in loss of horsepower and poor engine performance. This is even more true in diesel engines, which depend upon the heat of compression to ignite the fuel in the cylinders.

If you suspect a compression loss, check the engine compression as follows:

1. Warm up the engine to operating temperature.

2. Remove the spark plugs or injection nozzles.

3. Connect a pressure gauge to the cylinder port (Fig. 39).

4. On **spark-ignition engines,** be sure that both carburetor throttle and choke valves are in the wide open position. Disconnect the ignition coil-to-distributor wire at the distributor. Ground the wire by placing it in contact with some part of the engine.

5. On **diesel engines,** the air intake system has no throttle valve, so merely be sure that the engine speed control is in the "stop" position.

6. Turn the engine with the starter until the pressure gauge registers no further rise in pressure. It is a good practice to count the number of compression strokes (indicated by movement of the gauge needle) and check each cylinder with the same number of strokes. The engine must be at full cranking speed to get a good reading.

7. Check the pressure reading against the engine technical manual.

8. If the compression is very low, apply oil to the ring area of the piston through the openings. Do not use too much oil to avoid getting oil on the valves. Then check the compression again.

9. Judge the compression readings as given below.

JUDGING COMPRESSION READINGS

All cylinder pressures should be about the same—this is most important. Variations are usually limited to about 10 percent of the full reading.

If compression is too low, the engine must be reconditioned before a tune-up can be effective.

If compression in one cylinder is higher than the others, the other cylinders need reconditioning.

Altitude affects compression pressures. Normally there is about a 4 percent loss for every 1000 feet of altitude above sea level. Pressures given are normally for about 1000 feet above sea level.

Compression pressures are affected by the **cranking speed** of the engine. Therefore, be sure the batteries are in good condition and fully charged when making a compression test.

If it appears that engine service is needed, take the engine to a qualified serviceman for inspection.

CHAPTER QUIZ

1. Place an I by the parts of the Intake system, an E by the parts of the Exhaust system, an N by the parts that are Not a part of either system, and a B by parts of Both systems.

a._____muffler d._____air cleaner

b._____gasoline e._____manifold

c._____turbocharger f._____carburetor

2. The intake system supplies the engine with clean air of proper (quantity) (temperature) (mixture) (all of these).

3. Which of the following does not apply to dry element type air cleaners?

a. Clean off outside of element with an air hose.

b. Tap element on a hard surface to remove surface dust.

c. Wash element in any good detergent.

d. Use compressed air to dry element.

4. Match the items below:

A. Too little valve clearance.	1. Will cause cracking or breaking of the valve.
B. Too much valve clearance	2. Will cause the valves to burn.

(Continued on next page)

5. (Fill in blank.) During the_____stroke you can measure the valve clearance.

6. The valve clearance for intake and exhaust valves would need to be checked in the operator's manual since they may be different.

True_____ False_____

7. Air cleaners may contain oil.

True_____ False_____

8. What is the firing order for a 4-cylinder engine?

9. (Fill in blank.) If you identified the end of the compression stroke on an engine you would say the cylinder is at_____.

10. (Fill in blanks.) What are the two types of mufflers?_____and_____.

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valves will start to "crack" open before they reach their full-pressure settings. This can be noted by comparing the pressure and flow rate readings made in the circuit test above. Any great decrease in flow rate in these valves indicates a faulty valve.

As a general rule:

Faulty SYSTEM relief valves will affect readings in all tests.

Faulty CIRCUIT relief valves will affect only pressure readings in the individual circuits.

SUMMARY: TESTING THE SYSTEM

The tests we have given you are only basic guidelines. Once you start testing actual machines, use your machine technical manual for detailed tests and test results. And remember that the best testing equipment has no value unless the man at the controls knows how to interpret the results.

SAFETY RULES FOR HYDRAULIC SYSTEMS

1. Always wear eye protection and proper clothing when doing maintenance work on hydraulic systems.

2. Always lower the hydraulic working units to the ground before leaving the machine.

3. Park the machinery where children cannot easily reach it.

4. Block up the working units when you must work on the system while raised. Do not rely on the hydraulic lift.

5. Never service the hydraulic system while the machine's engine is running unless absolutely necessary, as for bleeding the system.

6. Do not remove cylinders until the working units are resting on the ground or securely on safety stands or blocks. Also shut off the machine's engine.

7. When transporting the machine, lock the cylinder stops to hold the working units solidly in place.

8. Be sure all line connections are tight and lines are not damaged. Escaping oil under pressure is a fire hazard and can cause personal injury.

9. When washing parts, use a *non*-volatile cleaning solvent.

10. To insure control of the unit, keep the hydraulic system in proper adjustment.

CHAPTER QUIZ

1. List three maintenance problems that concern a hydraulic system.

2. Match the symptom on the left with its cause on the right.

A. Oil bubbles or foaming oil	1. Water in the system
B. Change in oil level	2. Air leak somewhere in the system
C. Milky oil	3. Leaks in the external parts of the system

3. True or false? "Tighten leaking fittings as tightly as possible."

4. What is the biggest enemy of hydraulic systems?

5. Give one safety rule which you should follow to avoid injury to yourself or others from the hydraulic system.

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ments to obtain the best performance from a machine.

TURBOCHARGER—A blower or pump which forces air into the engine cylinders at higher-than-atmospheric pressure. The increased pressure forces more air into the cylinder, thus enabling more fuel to be burned and more power produced.

V

VACUUM—A perfect vacuum has not been created as this would involve an absolute lack of pressure. The term is ordinarily used to describe a partial vacuum; that is, a pressure less than atmospheric pressure; in other words a Suction.

VACUUM GAUGE—An instrument designed to measure the degree of vacuum existing in a chamber.

VALVE—A device which controls either 1) pressure of fluid, 2) direction of fluid flow, or 3) rate of flow.

VALVE CLEARANCE—The air gap allowed between the end of the engine valve stem and the valve lifter or rocker arm to compensate for expansion due to heat.

VAPOR LOCK—A condition wherein the fuel boils in the engine fuel system, forming bubbles which retard or stop the flow of fuel to the carburetor.

VENT—An air breathing device in a fluid reservoir.

VISCOSITY—The measure of resistance of a fluid to flow. An engine oil rating.

VOLATILITY—The tendency for a fluid to evaporate rapidly or pass off in the form of vapor. For example, gasoline is more volatile than kerosene as it evaporates at a lower temperature.

VOLTAGE—That force which is generated to cause current to flow in an electrical circuit. It is also referred to as electromotive force or electrical potential. Voltage is measured in volts.

VOLTMETER—An instrument for measuring the force in volts of an electrical current. This is the difference of potential (voltage) between different points in an electrical circuit. Voltmeters are connected across (parallel to) the points where voltage is to be measured.

VOLUME—The amount of fluid flow per unit time. Usually given as gallons per minute (gpm).

W

WIRING HARNESS—The trunk and branches which feed an electrical circuit. Wires from one part of the circuit enter the trunk, joining other wires, and then emerge at another point in the circuit.

ABBREVIATIONS

ASAE—American Society of Agricultural Engineers (sets standards for many components for agricultural use)

BDC—bottom dead center (of an engine piston)

BTU—Abreviation for *British Thermal Unit*. Amount of heat required to raise temperature of one pound of water (approximately one pint) 1° F. All substances are rated in relation to water as standard of measurement.

cu. in.—cubic inch

°F—degrees Fahrenheit (of temperature)

ft.—feet

ft.-lbs—foot-pounds (of torque or turning effort)

gpm—gallons per minute (of fluid flow)

hp—horsepower

I.D.—inside diameter (as of a hose or tube)

in.—inch

mph—miles per hour

O.D.—outside diameter (as of a hose or tube)

psi—pounds per square inch (of pressure)

rpm—revolutions per minute

SAE—Society of Automotive Engineers (sets standards for many components for both automotive and agricultural use)

sq. ft.—square feet

sq. in.—square inch

TDC—top dead center (of an engine piston)

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INSTRUCTOR'S KITS

Preventive Maintenance Instructor's Kit (FMO-167K). Loose-leaf binder of activities, exercises, masters based on FMO "Preventive Maintenance" text. Includes copy of text. John Deere Service Publications, Dept. F., John Deere Road, Moline, Illinois 61265.

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Publisher: McGraw Hill. New York, New York
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Model Checklist #2
A Checklist for Evaluating Instructional Textbooks in Occupational Education

		Yes	No	NA	Comments
Author					
1.	Do the author's credentials seem to qualify him/her as an expert in the field?	X			Authors' experience in distributive education is extensive. The combination of three authors and a consultant provides a varied background in distributive education and industry. (p. ii)*
2.	Do the authors and/or consultants have experience in the subject area?	X			
Content					
3.	Does this book match the instructional content for the course curriculum?	X			The text offers a thorough coverage of the marketing area. Chapters include the Functions of Marketing, Consumer Buying Behavior, the Industrial Market, Elements of Pricing and Promotion at Work. (Table of Contents p. v-vi)*
4.	Is the content timely and up to date?	X			
5.	Are the chapters and/or size of the reading units short enough to hold the reader's interest?	X			The book is divided into 11 units, then subdivided into 41 chapters. The average unit length is 38 pages. The average chapter length is 10 pages.
6.	Has the author presented the occupational content toward the appropriate student level? (i.e., secondary vs. postsecondary)	X			This book is suitable for secondary level students.
7.	Is information presented in a logical order by chapter or within chapters?	X			The information is arranged around unit topics devoted to the product, pricing, distribution, promotion and marketing behavior. (Table of Contents p. v-vi)*
8.	Are the technical terms defined in the textbook?	X			The vocabulary is highlighted within each chapter using boldface type to emphasize new words. Each word is defined within the narrative and clear, concise examples are given to support the definitions. (p. 311)*
9.	Are clues to the meaning of technical terms provided?	X			

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comments
10.	Are abbreviations, symbols, and/or formulas clarified?	X			
11.	Does the book introduce new concepts at an appropriate pace?	X			Chapters are subdivided into concept areas. Each concept area is proclaimed in heavy bold type with lines dividing sections. (p. 314)*
12.	Does the book incorporate important safety rules? (i.e., information on OSHA, NOSHA)			X	
13.	Are males/females pictured in non-traditional as well as traditional roles?		X		
14.	Does the textbook provide a clear explanation when introducing new concepts?	X			New concepts are first discussed in general terms followed by dots in the textbook margin to highlight specific details or points of importance. Major points of importance are often summarized in a sentence written all in italics. Additional discussions explain more fully. (p. 311)*
15.	Does the textbook give concrete examples when introducing difficult ideas?	X			Concrete examples are cited with the introduction of each new concept.
16.	Is the equipment described with a sufficient degree of simplicity as needed for classroom instruction?	X			
Illustrations					
17.	Does the book provide adequate diagrams or illustrations needed for occupational understanding?	X			Illustrations and diagrams are mainly used to reinforce or highlight a discussion rather than teach a concept. The need for diagrams as an instructional tool does not seem as appropriate here as in other occupational texts.
18.	Are the illustrations explained clearly and referenced to the narrative?			X	
19.	Are the illustrations and diagrams clearly labeled?			X	

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comment
20.	Can the reader easily match the illustrations to the printed material? (i.e., pictures can lose their value if they are located too far from the discussion to which they pertain)	X	___	___	
21.	Are the illustrations provided in a sequential manner?	X	___	___	Graphs, advertising sketches, cartoons, and photographs are timely and attractive.
22.	Are simplified diagrams presented for the entry level student?	X	___	___	
23.	Does the textbook provide enough illustrations and diagrams to capture the interest of a student?	X	___	___	
24.	Are the tools and supplies illustrated in the textbook common for use in the occupations?	X	___	___	
Organization					
25.	Is the print size appropriate to the material and the student?	X	___	___	
26.	Is the print easy to read?	X	___	___	

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comment
27.	Are the tasks involved in a procedure presented in a logical order?	X			
28.	Is the information arranged clearly, with appropriate subheadings?	X			The information is clearly arranged under subheadings within each chapter.
29.	Is the format of the book appealing and attractive for its intended audience?	X			
30.	Are student objectives listed at the beginning of each chapter?		X		
31.	Is an introduction provided for each chapter?	X			An introduction is provided at the beginning of each chapter. A narrative sketch at the beginning of each chapter introduces the content to be discussed. (p. 309)*
32.	Does the book have reference aids that are clear and easy to use, such as table of contents, index, bibliography and appendices?	X			There is a table of contents and index. No bibliography or appendix is provided. (p. V, VI, p. 319)*
33.	Within the narrative is the reader directed to the appendices for further information?			X	
34.	Are summaries provided at appropriate intervals in the text to reinforce important learning?		X		

*The numbers in parenthesis refer to the sample pages from the textbook.

		Yes	No	NA	Comment
35.	Does the book contain a glossary or list of definitions?	___	X	___	No glossary is provided, but the author adequately presents the technical terms within the context of each chapter and in the student activity workbook(p. 309-319)*
36.	Do glossaries give definitions that are easily understood?	___	___	X	
37.	Are review questions provided at the end of each chapter and/ or section?	X	___	___	There are five types of learning activities at the end of each chapter to help students put into practice the material studied. Each unit ends with an actual case drawn from an authentic marketing situation. The case is presented to emphasize the elements brought out in each unit and can be used by the class as a basis for large or small group discussions, panel presentations, or additional research into the latest marketing practices. (p. 319)*
	A. Are the directions easily understood?	___	X	___	
	B. Are questions clearly stated?	___	X	___	
	C. Are the questions designed to test the reader's understanding of textbook material?	X	___	___	
	D. Are the questions pertinent to the basic principles of the occupation or task?	X	___	___	
	E. Do the questions provide an opportunity for the student to draw conclusions based on facts presented in the chapter?	X	___	___	
38.	Does the text provide suggested activities for students to expand their newly learned skills?	X	___	___	

*The numbers in parenthesis refer to the sample pages from the textbook.

Teaching Aids	Yes	No	NA	Comment
39. Does the publisher provide:				
A. A teacher's manual?	X			The teacher's manual contains student objectives for each textbook chapter, suggestions for organizing and teaching the course, solutions to the student activities in both the textbook and activity guide (workbook), and three (3) ready-to-duplicate objective tests with keys. This manual is divided into units. Each unit provides a list of student goals and objectives, suggested motivational activities for launching the unit, suggestions for developing the unit, suggestions for summarizing the unit, and an answer key for the review questions at the end of each chapter and/or unit.
A1. Does the teacher's manual assist the instructor in planning individual lesson?	X			
A2. Are answers to chapter questions provided in the manual?	X			
A3. Does the manual contain a reprint of the pages from the student's text?		X		
A4. Does the manual provide a bibliography?		X		
A5. Does the manual include a list of films, tape recordings, etc. for teacher use?		X		
A6. Does the manual provide discussion questions for the teacher to stimulate a class to talk about the lesson?		X		
A7. Are suggestions for student activities and projects provided for each chapter?	X			

*The numbers in parenthesis refer the sample pages from the textbook.

		Yes	No	NA	Comment
B.	Workbooks?	X			
B1.	Are workbooks suitable for the student to work on an independent basis?	X			The Project Activity Guide (workbook) enriches and extends the learning experience. Each chapter of the workbook opens with a marketing vocabulary builder and a series of quick-check questions. At the end of each workbook chapter is a marketing game that stresses key marketing concepts.
B2.	Do the workbooks reinforce major ideas presented by the textbook?	X			
C.	Audiovisual aids? (i.e., filmstrips, movies, overhead transparencies)		X		
D.	Ditto masters?	X			
D1.	Does each textbook chapter have a corresponding review ditto?	X			
E.	Tests?	X			
E1.	Do the questions test major concepts needed for competency in the occupation?	X			
Cost and Durability					
40.	Is the cost of the textbook reasonable?	X			
41.	Is the book durable enough to last three to five years under normal student use?	X			The book has a hard cover, and good quality paper is used for the interior of the book.

*The numbers in parenthesis refer to the sample pages from the textbook.

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About the Authors

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PETER G. HAINES is a professor of secondary education and curriculum at Michigan State University. His assignments include teaching and conducting research in vocational education and serving as program leader for business and distributive education. He was formerly Director of the Research and Development Program in Vocational-Technical Education. Dr. Haines has had extensive experience as a teacher of distributive education and marketing. He has been President of the Michigan Business Education Association and the Council for Distributive Teacher Education. He is a frequent contributor to professional publications and has appeared at teacher workshops, seminars, and conferences throughout the United States.

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and some of their projects have influenced marketing practices in their communities.

One Iowa chapter of the Distributive Education Clubs of America (an organization of vocational marketing students known as DECA) conducted research on consumers' opinions about dairy products which aided the entire industry. When the survey was completed and the results tabulated and summarized, the DECA members sent a copy of their report to the state's dairy council, which found the results valuable in increasing sales of dairy products. The DECA chapter received not only statewide but national recognition for its marketing research project.

National DECA sponsors two types of research activity for high school students. One is a group project for a DECA chapter. The study described at the opening of this chapter is an example. The other type of research activity sponsored by DECA is for individuals.

Creative Marketing Projects

Activities conducted by a local chapter of DECA members in cooperation with Sales and Marketing Executives International (SMEI) are called ***Creative Marketing Projects***. SMEI is a professional organization of sales executives.

A Creative Marketing Project usually involves some form of research. Its goal is to bring about a measurable improvement in the local economy by increasing sales, improving services, providing more employment, increasing income, or bettering shopping facilities. The project must be completed within a school year. Here are some results of Creative Marketing Projects:

- A local business and service directory was published. It included a map of the area, notes on its historical sites, and a listing of business and service organizations.
- Public parking facilities in a business district were improved.
- Public interest was gauged in redeveloping an older downtown section of a Colorado community as a shopping and entertainment center with an 1890's theme.

Individual Competency-Based Events

Individual DECA competitive events are based on marketing career areas (subclusters) such as apparel and accessories, food

(Courtesy of the Distributive Education Clubs of America)

Winners of DECA competitive events know the value of marketing research.

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MARKETING CASE 8 MARKETING CASE

The Many Marketing Channels of Hallmark

For years, Hallmark Cards, Inc., has been the leader in the greeting-card industry. Its reputation for producing and marketing quality merchandise is well known. It promotes its products by saying that when its customers "care enough to send the very best," they buy Hallmark.

Hallmark makes cards under both the Hallmark and Ambassador labels. Ambassador is a less expensive line which is sold through 13,000 supermarkets and discount outlets. It makes up about one-third of the $1 billion card market. Hallmark uses these retail outlets—supermarkets and discount stores—to reach a maximum number of customers with its less expensive card line. Customers coming to the supermarkets and discount outlets for convenience goods at reasonable prices, see the less expensive Hallmark cards on display and buy them.

The first Hallmark Card shops were opened in 1963 when the company branched into selling wrapping paper and snapshot albums. Hallmark now sells these items plus paper party goods for all occasions: tablecloths and decorations, napkins, plates, cups, and plastic glasses, knives, forks, and spoons. Most of the retail shops are owned by individuals. The company itself owned only 18 stores out of some 6000 in 1978. To increase sales, many of the retailers have been stocking gifts and novelties purchased from other suppliers. But this requires the use of a great many order forms and terms of sale. The retailers cannot depend on prompt delivery of merchandise from these suppliers. Quality of products is a problem when dealing with several suppliers.

Recently, Hallmark introduced new products—jewelry, pewter, and crystal items, and a wide range of bath products. All of these new products are to be sold exclusively through Hallmark dealers. The company intends to introduce a new noncard item every 12 to 18 months.

Hallmark will support its retailers with national advertising and TV programs about Hallmark merchandise. Over 6000 independent dealers will benefit from a wider selection of quality merchandise. They will be less dependent upon card sales for sales and profits. They will be more certain of deliveries. Fewer order forms will be necessary. The usual terms of sale will be available. A Hallmark dealer in Yankton, South

Dakota, writes as follows about one Hallmark line of goods, called Little Gallery. "Little Gallery products don't have to be pushed. They can almost sell themselves."

Questions

1. What marketing channels does Hallmark use?
2. How do retailers gain through buying exclusively from Hallmark?
3. How does Hallmark gain by selling certain products through supermarkets and discount outlets?
4. What problems have retailers had through stocking gifts and novelties from other suppliers?

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Advertising Media

"So You Wanna Be in a TV Commercial?"

So the ad read, in the *Cedar Rapids Gazette*. It invited customers of the Merchant's National Bank to "audition" for the bank's forthcoming television commercial. The bank wanted to show that its many services make banking easier. To do this it chose the campaign slogan, "Hey, that's easy."[1]

The unique idea of a local TV commercial starring people playing themselves had two major advantages. It promoted the image of the bank in the community. At the same time, it saved on talent costs, which are a big part of TV ad production costs, particularly if a large cast is involved. And the cast for Merchant's National's ads was large. Eighty-five customers were selected to appear on TV. The finished commercial showed them singing the praises of MNB services. Everyone taking part received a tee-shirt and was invited to a "cast party" before the commercial "premiered" on local television. Later, posters featuring a scene from the commercial and topped by the lyrics of its song were also printed and distributed.

To get its message across, the Merchant's National Bank used several advertising media in imaginative ways.

Advertising media are the communications channels used by advertisers to inform customers about products and encourage potential customers to buy them. This chapter discusses the following ten types of advertising media:

- newspapers
- magazines
- radio
- television
- direct mail advertising
- outdoor advertising
- transit advertising
- specialty advertising
- directories
- program advertising

[1]Hooper White, "A Local Twist to a Bank's Advertising: Using Townsfolk to Star in a Commercial," *Advertising Age*, 19 June 1978, 41–42.

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SO YOU WANNA BE IN A TV COMMERCIAL?

HEY, THAT'S EASY! SHOW UP AT CEDAR RAPIDS' BIGGEST CASTING SESSION SATURDAY NOV. 26 AT MERCHANTS NATIONAL BANK

Be a star! Get famous! Astound your friends!

Even earn some extra money to add to your MNB account!

You don't have to be an actor (might help if you aren't).

You don't need any training or experience.

You don't even have to be beautiful or handsome. Or young.

All you do have to be is over 18 and a customer of the Merchants National Bank. And a nice person (like all the rest of our customers).

You might want to practice smiling.

Now, don't get all gussied up for the casting session. We want you as you are.

So come dressed in what you wear to work or what you stay home in mostly. What you're comfortable in.

Come to the Main Bank downtown, 10 A.M. to 4 P.M.

If you're picked for one of the 50 or so parts, you'll come back on Saturday December 3rd for the actual filming. Just like in the movies.

And you'll be paid for the part you're selected to play.

This just might be the most fun you ever had in a bank.

Merchants National Bank

Cedar Rapids, Iowa 52401

A BANKS OF IOWA BANK

What are the advantages of this advertising campaign?

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Newspaper Advertising

People depend on newspapers for detailed coverage of national, international, and local happenings. While radio and television present the news more frequently, the reporting is brief and often lacking the depth. Newspapers not only give in-depth news coverage but also offer something for everyone—world news, editorials, society news, sports news, fashion trends, and comics. Of course, tucked into these same pages are numerous ads. Many people are just as interested in the ads as they are in the news. They study the ads to learn what is new in fashions, home furnishings, and cars, and they compare prices on foods and other necessities. The Wednesday and Thursday supermarket ads and Friday weekend bargains offered by discount houses, department stores, appliance stores, and other retailers are of special interest to many readers.

Newspapers offer a number of benefits to the advertiser:

- *Newspapers saturate the local market.* Because of the wide variety of coverages offered, the newspaper is read by the whole family. In the United States, about 80 per cent of all families read one or more daily newspapers. Because many families read their local newspapers, the Merchant's National Bank chose newspaper advertising in seeking out its local cast of customers.
- *Newspapers give information about local businesses.* This information often includes products and prices. Even in the 20 or so largest markets throughout the country, newspapers are able to zone the paper into geographical sections, providing local news and giving local advertisers more specific market saturation. For example, the *Chicago Tribune* has developed nine *Suburban Trib* sections enabling advertisers in, say, Du Page County—directly west of Chicago—to reach only readers and prospective customers in that county.
- *Newspapers are timely and flexible.* Ads can be prepared and inserted just a few hours before publication. For example, when a heavy snow falls, newspaper ads can quickly be changed to feature sleds, snow tires, skis, and cold-weather clothing. Magazines do not have this flexibility.
- *Newspaper ads can be cut out and used as shopping guides.*
- *Newspaper ads can include coupons.* The shopper can clip the coupons and use them toward the purchase of a product.
- *Newspapers are read consistently.* There is little significant fall-off—an estimated 2 percent—during the summer months. This is not the case with television viewing, which declines significantly during the summer months.

Two types of newspaper advertisements are display and classified. ***Display advertisements*** appear throughout a newspaper and use pictures, art, or different styles of type or print to attract attention. They are used primarily by business firms.

Unlike display ads, ***classified advertisements*** are grouped in special pages of newspapers or magazines by the product or service advertised and generally contain only copy. The type style and format of most classified ads follow the pattern set by the newspaper. Classified ads are used to sell household furnishings, pets, and other belongings, and to advertise personal services, such as yard work, house painting, and floor repair. They are also used by real estate agencies, employment agencies, and car dealers to advertise goods or services.

Magazine Advertising

Magazines are a favorite medium of the national advertiser. It is estimated that almost 80 percent of all national advertisers spend

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at least $25,000 a year on magazine advertising.

Magazines offer a number of benefits to the advertiser:

- They permit the advertiser to determine an audience. Magazines such as *Seventeen* appeal primarily to teenage girls. Others, such as *Better Homes & Gardens*, appeal to homemakers. Car "buffs," sports enthusiasts, and business people are attracted to magazines such as *Hot Rod Magazine*, *Sports Illustrated*, and *Business Week*. Magazines such as *Arizona Highways* concentrate on an area of the country or on a particular state.
- Magazines can present superior color reproduction, whereas newspapers generally cannot. Thus, magazine ads generally stimulate the desire for goods better than newspaper ads; magazine ads can also show greater product detail, better illustrating, for example, the textures of fabrics.
- While newspapers are usually thrown away soon after they are read, magazines are likely to be saved for future reference. This gives the advertiser more exposure. Studies have shown that each issue of some magazines is passed along to as many as eight or nine readers.

Radio Advertising

In the years before television, radio was the prime form of entertainment. National advertisers spent huge sums of money on national network programs. When television became popular in the 1950s, national advertisers quickly turned their attention to this new medium and radio network programs declined sharply. While television became a source of home entertainment especially in the evening hours, the radio became a source of entertainment for listeners wherever they happened to be: in the car, at home, or at work. The development of the transistor has made the radio an even more popular entertainment medium. Transistor radios can be found in the home, workshop, automobile, boat, and at the beach. During the summer months, more people can be reached by radio than by television.

Radio provides advertisers with more outlets than any other major medium. There are only 1513 daily newspapers in the United States, but there are about 4500 commercial AM radio stations and nearly 3000 FM stations. National advertisers can select the areas that are major markets for their goods or services and advertise on stations serving those areas. Local business people can confine their advertising to the stations within their trading area.

Today, most radio advertising consists of spot announcements ranging from ten seconds to one minute in length. However, a few programs are sponsored, which means that a company pays for a program from five minutes to a half-hour in length, and it has exclusive advertising rights. For example, a local restaurant may sponsor one radio station's afternoon weather and traffic report.

Television Advertising

From very modest beginnings in 1948, television has grown to be a powerful advertising medium. It has done so by taking business from other media, especially from radio and newspapers. Television is now the prime family entertainment medium. More than 98 percent of all homes in the United States contain at least one set; the average set is on more than six hours a day.[2]

Television offers some real advantages to advertisers. It brings their messages to viewers with the dramatic impact of sight,

[2]A. C. Nielsen Company, *Nielsen Television*, 1978.

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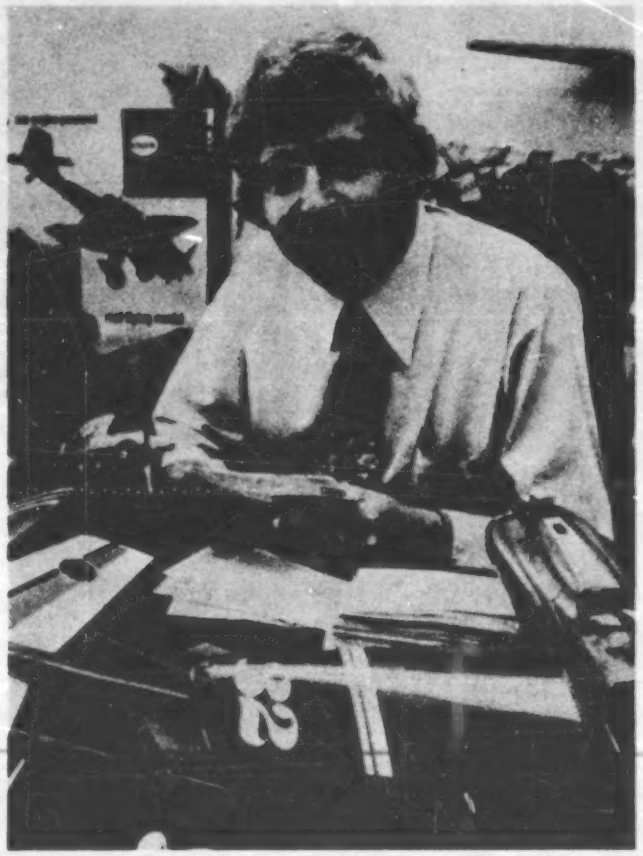
"I like Boys' Life. At Cox, when it comes to media decisions, it's Boys' Life... and what else?"

Steven A. Zieg, Product Manager
L. M. Cox Manufacturing Co., Inc.
Santa Ana, California



"Boys' Life fits our demographic needs so precisely we sometimes wonder if it wasn't made to our order. The car, plane and train models we manufacture are designed so a father can introduce his son to Cox engine power as early as his eighth birthday. And we build a succession of more and more sophisticated models that'll entertain and educate that boy through his fifteenth year... and beyond.

"We're always looking for young people who are interested in making things work and it is obvious the readers of Boys' Life are. We've investigated every medium. **On a CPM basis nothing is as effective for us as Boys' Life.** Boys' Life is mentioned on so many of the Warranty Research Cards returned to us that we'd be crazy to give it up. That would be the same as throwing business away.

"We advertise in other magazines, too. And on TV. With them we accept and pay for a lot of waste circulation. **In Boys' Life every bit of the circulation works for us.**

"I wish every one of the 12 million boys in America would subscribe to Boys' Life. It would make our job easier. We'd be able to reach our entire market with just one buy... efficiently."

Keep in touch with over 4 million young Americans — in Boys' Life.

The Boys' Life Reader Panel can tell you what young America thinks of your brand. Interested? Call Robert Goldsmith at (212) 532-0985. Or write him at Boys' Life, 271 Madison Avenue, New York, N.Y. 10016. Published by Boy Scouts of America.

(Reproduced with the permission of Boy's Life Magazine.)

Magazines permit the advertiser to deter[illegible]e an audience.

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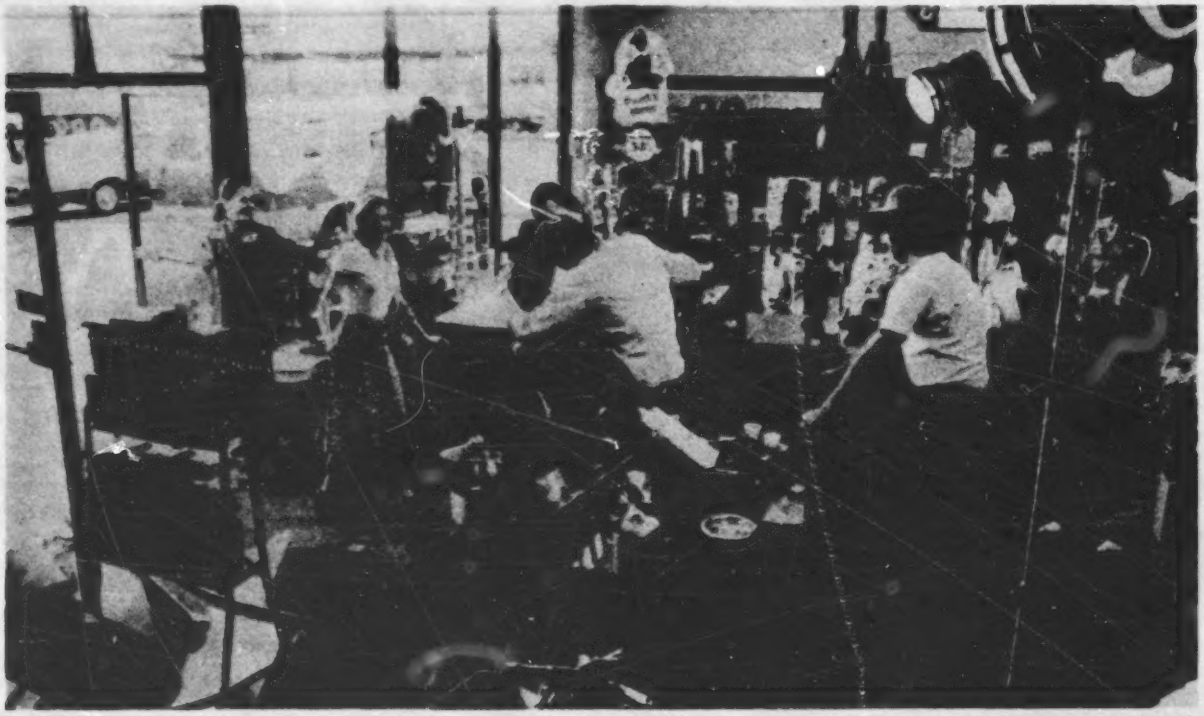

(Credit: Courtesy Pic N' Pay Stores, Inc., Charleston, N.C.)

Producing a television commercial is both costly and time-consuming, but the results are often greatly increased sales.

sound, motion and—in 78 percent of all homes—color. Moreover, television commands the close attention of the viewer. Imagine the number of people in Cedar Rapids who heard the bank's advertising message while looking for family and friends in the Merchant's National Bank commercial. Finally, all family members are likely to watch TV, often together. They may make comments and suggestions to each other about advertised products. This makes television a powerful medium for advertising a great many goods and services.

Programming

While many local businesses advertise on local TV channels, television is primarily a national medium of advertising. It is dominated by the three major networks—American Broadcasting Company (ABC), Columbia Broadcasting Company (CBS), and National Broadcasting Company (NBC). Many television stations are owned by one of these three networks. Others are locally owned but affiliated with a network, in which case they devote most of their time to hookups with national networks for certain programs. In return, the local stations receive a certain percent of the time charges paid by the advertisers for national network time.

Types of Television Advertising

The two basic types of television advertising are network and local. Network advertising

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feature Spanish-copy ads. Also, political candidates can restrict their "showing" to districts where their voters live. Second, the message stays where it is for a long time, and passersby can see it again and again. Finally, the message can be made very large; dramatic use of color, art, and even movement can be made as well.

Outdoor advertising is used by both national and local advertisers. National advertisers who make extensive use of billboards usually have their messages printed on posters and pasted to the structures. Local advertisers usually have their signs painted. The cost of billboards and signs depends on the size of the sign, the location in which the sign will be posted, and the length of time the space will be used.

Transit Advertising

Advertising that is used in buses, subways, and commuter railroad cars, and in railroad, bus, and airline terminals is called ***transit advertising***. It is estimated that commuters and other passengers make more than 10 billion trips in public vehicles each year, and transit advertising is aimed at this group. Three basic types of transit advertising are car cards, traveling displays, and station posters.

Car cards are advertising signs found in the interiors of buses, subways, and commuter trains. Most of them are 11 by 28 inches in size. They are used by banks, chewing-gum manufacturers (Wrigley is the largest user of car cards), private schools, and many other types of businesses, as well as by various nonprofit organizations.

Exterior displays are ads placed on the outside of moving vehicles, mostly buses. As the bus travels its route, the message is exposed to those waiting to ride the bus and to pedestrians and motorists as well.

Both car cards and exterior displays are purchased in what is called a "showing." A "full-run showing" is one card in or on every vehicle owned by the transportation company. Rates are by the month. A full-run showing in one large city subway system costs about $26,000 a month.

Station posters are ads located in subway and railroad stations and bus and airline terminals. Like exterior displays, station posters are purchased by showings, the cost depending on the number of displays used and the length of time they are shown.

Transit advertising offers two primary appeals to advertisers. It reaches people who are likely to be in or near the business area, and considering the number of people it reaches, it is economical.

Specialty Advertising

Advertising that consists of providing a useful item to a potential customer and placing an advertising message on it is called ***specialty advertising***. For example, the tee-shirts given to the Merchant's National Bank cast of customers are a form of specialty advertising. The list of specialty advertising products is limited only by the imagination of the advertiser. Here are some examples:

Address books	Key rings
Almanacs	Kitchen reminders
Appointment books	Litter bags
Auto-bumper signs	Luggage tags
Auto-license frames	Maps
Badges and buttons	Money clips
Balloons	Note pads
Blotters	Paperweights
Book covers	Pens and pencils
Calendars	Phone indexes
Coasters	Place mats
Cookbooks	Record books
Desk calendars	Rulers
Diet guides	Shopping bags
Frisbees	Travel guides

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Specialties have certain characteristics that make them popular as an advertising medium. First, they are useful items. The recipient is actually receiving a gift for looking at the advertising message. Second, they provide repeat advertising. Every time a person picks up a pencil or a memo pad advertising an insurance company, for example, they see the company's advertising message. Third, specialties do not require high-priced advertising campaigns, and the cost per item is very low. Finally, specialties can be planned specifically for potential customers; for example, free sewing needles can be given by a yard-goods store to potential customers.

Directories and Program Advertising

Many trade and business directories accept advertising. These include city, medical, educational, building, and professional directories.

The most important directory for advertisers is the classified section, or Yellow Pages, of the telephone directory. All businesses that have telephone numbers are automatically listed by classification in the Yellow Pages, which may be bound as a separate volume. While all businesses are automatically listed, the telephone company encourages them to buy large ads in addition to the listing. Families moving into a new neighborhood rely on the Yellow Pages to locate and establish regular buying sources. Even established residents and business firms turn to the Yellow Pages when looking for distributors or suppliers of goods and services.

"Program advertising" refers to advertising that appears in church bulletins, school-play and athletic programs, and school yearbooks. Most businesspeople look upon this type of advertising as a donation, since they expect to receive little benefit from it. For this reason, many do not try to sell their products in the ad but take advantage of the public relations value by including a statement such as "Compliments of XYZ Store."

Build Your Marketing Vocabulary

On a separate sheet of paper define each of the following marketing terms; then use each term in a sentence.

Classified advertisements
Direct mail advertising
Display advertisements
Mailing list
Outdoor advertising
Specialty advertising
Transit advertising

Review and Discuss

1. What media were used in the Merchant's National Bank campaign and why was it effective?
2. Explain four benefits of newspaper advertising to the advertiser.
3. Television and radio are called the "broadcast media" because the airways broadcast their messages. What are the advantages of the broadcast media to advertisers?
4. What are the advantages of direct mail as an advertising medium?
5. Give several reasons why specialty advertising is a popular advertising medium.

Analyze Marketing Concepts

1. Prepare a form like the one at the top of the next page. List the following descrip-

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Description of Advertising Medium	Newspaper	Magazine	Radio	Television
Example: Increased audience during summer months.			✓	

tions in the left-hand column: (a) primarily a national medium, (b) a family entertainment medium, (c) a personal entertainment medium, (d) saturates the local market, (e) permits audience selectivity, (f) commands a person's entire attention, (g) can be saved and referred to again at the person's convenience. Place a check mark in the appropriate column at the right to indicate the type of advertising medium described.

2. Prepare a form like the one below. List the following advertising media in the left-hand column: (a) newspaper, (b) magazine, (c) radio, (d) television, (e) direct mail, (f) outdoor advertising, (g) specialty advertising, (h) methods of transportation. In the other two columns, describe how a manufacturer and a large department store might use each medium listed. If you feel that one of the businesses would not use a specific medium, explain your reason.

Advertising Medium	Used by Manufacturer	Used by Department Store
Example: Telephone directory	Might buy a special ad in the Yellow Pages for each major city.	Might buy a large special ad in the Yellow Pages of the local telephone directory.

Marketing Project 30

Studying Advertisements

Project Goal: Given a number of ads in your local newspaper, explain the placement and pattern of the ads during a one-week period.

Action: Study the display ads in the issues of a daily newspaper for one week to find answers to the following questions:

1. Which types of businesses run the largest ads most often?
2. What is the approximate ratio of local to national ads?
3. Which types of businesses usually seek the most prominent placements? And which ads consistently appear in the same place?
4. Do some businesses use certain days of the week?
5. Is there a relationship between the location of news articles and the ads?

Write the results of your findings, and prepare to discuss them in class.

Evaluation of Booklet
Criteria For Evaluating Instructional Textbooks
in Occupational Education

Request to Users: The Office of Occupational and Continuing Education and the Bureau of Occupational Education Research would like to know if the information in this booklet was useful to you. Please complete the enclosed form, fold the sheet as indicated with the address outside, and mail it. Thank you for your assistance.

Please answer all questions:

1. What is the name of your educational institution?

2. What is your title? (i.e., vocational instructor, reading teacher, content area teacher)

3. What occupational education program area do you deal with ? (i.e., agriculture, home economics, etc.)

4. In what ways did you find the checklist useful?

5. What are the strengths of the checklist?

6. What are the weaknesses of the checklist?

7. What books did you use the checklist on?